

HITACHI

SERVICE MANUAL

NTSC M2XU CHASSIS

PA No. 0024

20SA2B/C032
20SA4B/C034

R/C: CLU-681GJ
CLU-691GR

CAUTION: Before servicing this chassis, it is important that the service technician read the "Safety Precaution" and "Product Safety Notices" in this Service Manual.

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This television receiver will display television closed captioning (CC or □) in accordance with paragraph 15.119 of the FCC rules.

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Repairs made by unqualified persons could be dangerous to the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health and Safety Code, Section 25249.5).
When servicing this product, avoid contact with the solder which contains lead. Do not inhale any smoke or fumes produced.
Also, when soldering do not inhale any smoke or fumes produced.

SAFETY NOTICE

USE ISOLATION TRANSFORMER WHEN SERVICING

Components having special safety characteristics are identified by A, B, or C in this Service Data and its supplements and bulletin. Before servicing this chassis, it is important that the service technician read and follow the "Safety Precautions" and the "Product Safety Notices" in this Service Manual.

* For continued x-radiation protection, replace picture tube with original type or Hitachi approved equivalent type.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

SOLID STATE COLOR TELEVISION

July 1993

HHEA - MANUFACTURING DIVISION

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis or picture tube.

WARNING: Since the chassis of this receiver is connected to one side of the AC power supply during operation, whenever the receiver is plugged in, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of receiver.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on a "HOT" chassis receiver.
3. When replacing a chassis in the receiver, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment cover-shields, isolation resistors, capacitors, etc.
4. When service is required, observe the original lead dress. Extra care should be taken to assure correct lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by a different manufacturer. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock and be sure that no protective device built into the receiver by the manufacturer has become defective or ineffectively defeated during servicing. Therefore, the following checks should be performed for the continued protection of the customer and service technician.

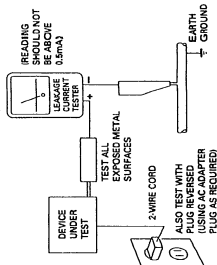
Leakage Current Cold Check

With the AC plug removed from the 120V AC 60Hz source, place a jumper across the two plug prongs. Turn the power switch on. Using an insulation tester (D5500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.24M Ω and a maximum resistor reading of 12M Ω . Any resistance value below or above this range indicates an

abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into an AC 120V 60Hz outlet (do not use an isolation transformer for this check). Turn the AC power switch on. Using a "leakage current tester (Simpson Model 229 or equivalent)", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis, to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5mA.



AC LEAKAGE TEST

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE RECEIVER TO THE CUSTOMER.

High Voltage

This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold down circuit when servicing, so that this hold down circuit is operated correctly.

Serviceperson Warning

With minimum Brightness and Contrast, the operating high voltage in this receiver is lower than 31.0kV. In case any component having influence on the high voltage is replaced, confirm that high voltage with minimum Brightness and Contrast is lower than 31.0kV. To measure H.V. use a high impedance H.V. meter. Connect (+) to chassis earth and (-) to the CRT anode button (See the following connection diagram).

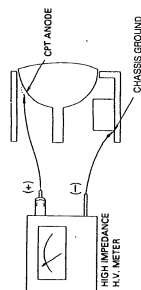
NOTE: Turn the power switch off without fail before the connection to the Anode button is made.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receivers have special safety related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified with an "X" mark in the schematics and parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the parts list in this Service Manual, may create shock, fire, X-radiation, or other hazards.

Production Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of HITACHI Service Manual may be obtained at a nominal charge from HITACHI HOME ELECTRONICS (AMERICA), INC.

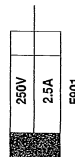


X-Radiation

TUBE: The primary source of X radiation in this receiver is the picture tube. The tube utilized in this chassis is specially constructed to limit X radiation emission. For continued X radiation protection, the replacement tube must be the same type as the original, HITACHI approved type. When troubleshooting and making test measurements in a receiver with an excessive high voltage problem, avoid coming unnecessarily close to the picture tube and the high voltage component. Do not operate the chassis longer than is necessary to locate the cause of the excessive voltage.

CAUTION

The following symbol near the fuse indicates fast operating fuse to be replaced. Fuse ratings appear within the symbol.



The rating of fuse F901 is 2.5A-250V. Replace with the same type fuse for continued protection against fire.

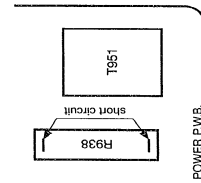
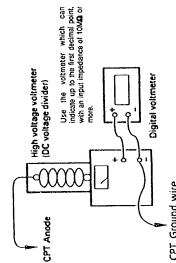
TECHNICAL SPECIFICATIONS

ANTENNA INPUT IMPEDANCE.....	75Ω (900Ω)	POWER INPUT	AC120V, 60Hz
CHANNEL COVERAGE		POWER RATINGS	115W
VHF BAND.....	2 - 13	CONVERGENCE	Self Convergence
UHF BAND	14 - 69	FOCUS	Electrostatic
CATV MID BAND	A-5 - A-1	PICTURE TUBE.....	AS1KQNS1X
	A-1	SPEAKER	2 Speakers (60 x 120mm)
SUPER BAND	J - W	SOUND OUTPUT	1W x 2
HYPER BAND	W-1 - W-28		
ULTRA BAND	W-29 - W-84		
RECEIVING CHANNEL	18 ch		
CHANNEL INDICATOR	DIGITAL/ON SCREEN		
INTERMEDIATE FREQUENCY			
Picture IF Carrier	45.75MHz		
Sound IF Carrier	41.25 MHz		
Sound IF	4.50MHz		

TECHNICAL CAUTIONS

High voltage limiter circuit operation check

1. Connect the high voltage voltmeter between the CPT anode terminal (anode cap) and ground as shown in the diagram.
2. Set the AC input voltage to 120 ± 3V.
3. Receive the broadcast signal and set the contrast level and the brightness level to maximum. Adjust the screen VR and sub brightness VR so that beam current is 1.25 ± 0.1mA.
4. Check that the constant high voltage is 26.5 ± 1.5kV at this time.
5. Set the AC input voltage to 100 ± 5V and then short circuit both ends of R938.
6. Leave the setting of the contrast, brightness and screen VRs as item (3) and gradually increase the AC input voltage. Check that the picture disappears when the high voltage is less than 31kV.
7. Turn the switch of the set off immediately after checking that the picture disappears.

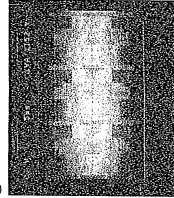


IC201

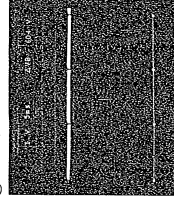
WAVEFORMS AT EACH SECTION

Numbers inside ○ correspond to locations shown in the circuit diagram.

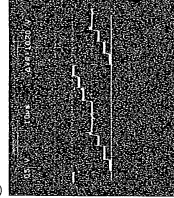
① U101 pin 7 IF (BM)



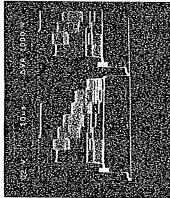
⑤ IC201 pin 28



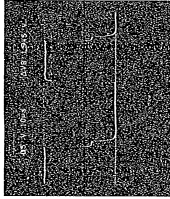
⑨ IC201 pin 19



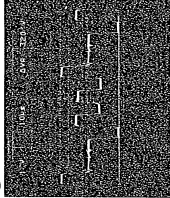
② IC201 pin 38



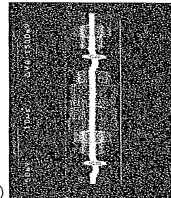
⑥ IC201 pin 23



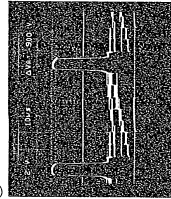
⑩ IC201 pin 20



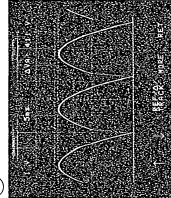
③ IC201 pin 36



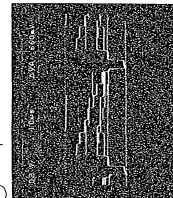
⑦ IC201 pin 21



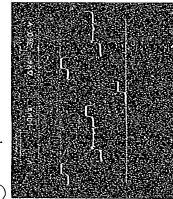
⑪ M-connector pin 3



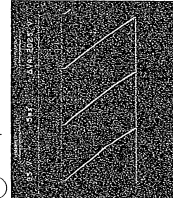
④ IC201 pin 34



⑧ IC201 pin 18



⑫ IC601 pin 7



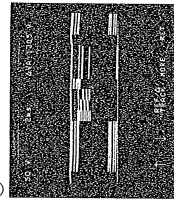
WAVEFORMS AT EACH SECTION

Numbers inside  correspond to locations shown in the circuit diagram.

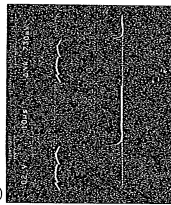
 IC601 pin 12



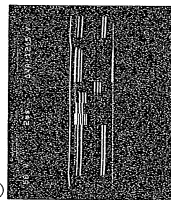
 Q801 collector



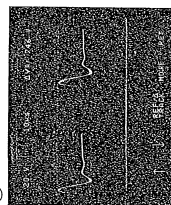
 Q705 base



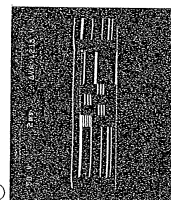
 Q802 collector



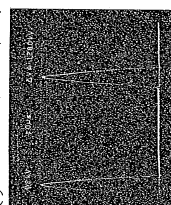
 Q705 collector



 Q803 collector



 Q704 collector (use 100x probe)



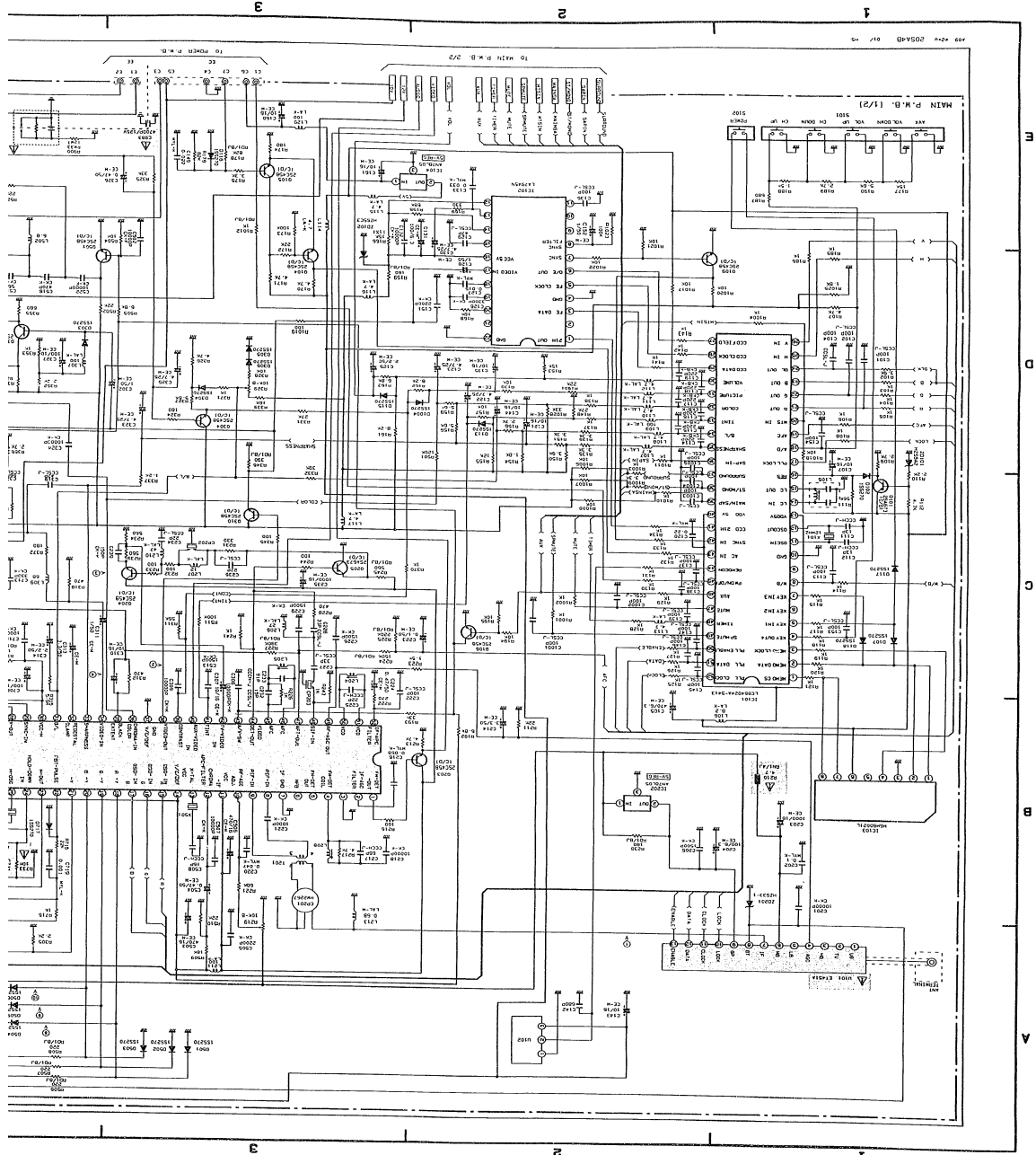
DC VOLTAGE TABLES

CIRCUIT NO.	PIN NO.	VOLTAGE (V DC)	CIRCUIT NO.	PIN NO.	VOLTAGE (V DC)	CIRCUIT NO.	PIN NO.	VOLTAGE (V DC)
Q101	B	4.5	Q802	B	5.3	IC101	37	0.1
	C	5.1		C	0.0		38	6.6
	E	5.2		E	0.0		39	8.4
	F	5.2		F	0.0		40	5.1
Q104	B	2.0	Q803	C	1.3	IC101	41	5.1
	C	2.0		E	0.0		42	0.1
	E	0.2		F	5.2		43	2.0
	F	0.2		G	8.8		44	5.2
Q105	B	0.2	Q804	C	4.4	IC101	45	5.0
	C	3.0		E	4.4		46	5.0
	E	0.2		F	5.1		47	5.1
	F	0.2		G	8.8		48	5.0
Q106	B	0.1	Q805	C	4.4	IC101	49	0.0
	C	0.0		E	4.4		50	0.2
	E	0.0		F	5.1		51	5.0
	F	0.0		G	8.8		52	5.0
Q109	B	0.7	Q901	C	4.5	IC102	3	0.8
	C	0.0		E	0.0		4	0.0
	E	0.0		F	5.1		5	0.0
	F	0.0		G	8.8		6	2.4
Q203	B	3.3	Q902	C	19.9	IC102	7	5.5
	C	3.0		E	18.9		8	4.7
	E	3.9		F	18.9		9	4.7
	F	3.9		G	18.9		10	4.1
Q204	B	4.0	Q903	C	18.9	IC102	11	3.8
	C	4.4		E	0.0		12	3.5
	E	0.0		F	0.0		13	3.5
	F	0.0		G	18.9		14	3.5
Q205	B	3.3	Q904	C	18.9	IC102	15	3.5
	C	3.0		E	0.0		16	3.2
	E	3.9		F	0.0		17	2.9
	F	3.9		G	18.9		18	2.9
Q301	B	5.2	Q905	C	5.1	IC103	19	2.9
	C	4.4		E	0.0		20	0.0
	E	0.0		F	0.0		21	0.0
	F	0.0		G	5.1		22	0.0
Q302	B	4.2	Q906	C	11.9	IC103	23	0.0
	C	4.2		E	11.9		24	0.0
	E	4.4		F	11.9		25	0.0
	F	4.4		G	11.4		26	4.6
Q303	B	2.2	Q907	C	0.0	IC103	27	2.3
	C	5.1		E	0.0		28	0.0
	E	0.0		F	0.0		29	0.0
	F	0.0		G	0.0		30	1.5
Q304	B	2.0	Q908	C	0.0	IC104	1	13.4
	C	0.0		E	0.0		2	13.4
	E	0.0		F	0.0		3	5.2
	F	0.0		G	0.0		4	5.2
Q305	B	2.9	Q909	C	6.3	IC104	5	5.2
	C	9.0		E	6.3		6	5.2
	E	2.2		F	6.3		7	5.1
	F	2.2		G	6.3		8	5.1
Q306	B	0.0	Q910	C	0.0	IC104	9	5.1
	C	0.0		E	0.0		10	0.0
	E	0.0		F	0.0		11	2.4
	F	0.0		G	0.0		12	2.4
Q307	B	2.9	Q911	C	3.5	IC104	13	5.2
	C	8.5		E	3.5		14	2.7
	E	2.2		F	4.1		15	2.9
	F	2.2		G	4.1		16	5.1
Q308	B	0.9	Q912	C	0.0	IC104	17	5.1
	C	0.0		E	0.0		18	5.1
	E	0.0		F	0.0		19	5.1
	F	0.0		G	0.0		20	5.1
Q309	B	0.0	Q913	C	0.1	IC104	21	0.0
	C	6.9		E	0.1		22	0.0
	E	0.0		F	6.2		23	0.0
	F	0.0		G	6.2		24	0.0
Q310	B	3.5	Q914	C	5.5	IC104	25	0.0
	C	5.1		E	5.5		26	4.6
	E	3.5		F	5.5		27	2.3
	F	2.2		G	5.5		28	0.0
Q312	B	6.1	Q915	C	27.4	IC104	29	0.0
	C	6.1		E	27.4		30	1.5
	E	1.5		F	0.0		31	3.5
	F	1.5		G	0.0		32	3.5
Q402	B	1.5	Q916	C	0.0	IC104	33	2.1
	C	5.2		E	0.0		34	4.2
	E	0.0		F	0.0		35	3.7
	F	0.0		G	0.0		36	0.5
Q403	B	0.0	Q917	C	11.8	IC104	37	0.5
	C	8.1		E	11.8		38	0.5
	E	0.0		F	9.4		39	0.5
	F	0.0		G	9.4		40	0.5
Q404	B	0.0	Q918	C	5.2	IC104	41	0.5
	C	0.0		E	5.2		42	0.5
	E	0.0		F	5.2		43	0.5
	F	0.0		G	5.2		44	0.5

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20SA4B/C034

DC VOLTAGE TABLES

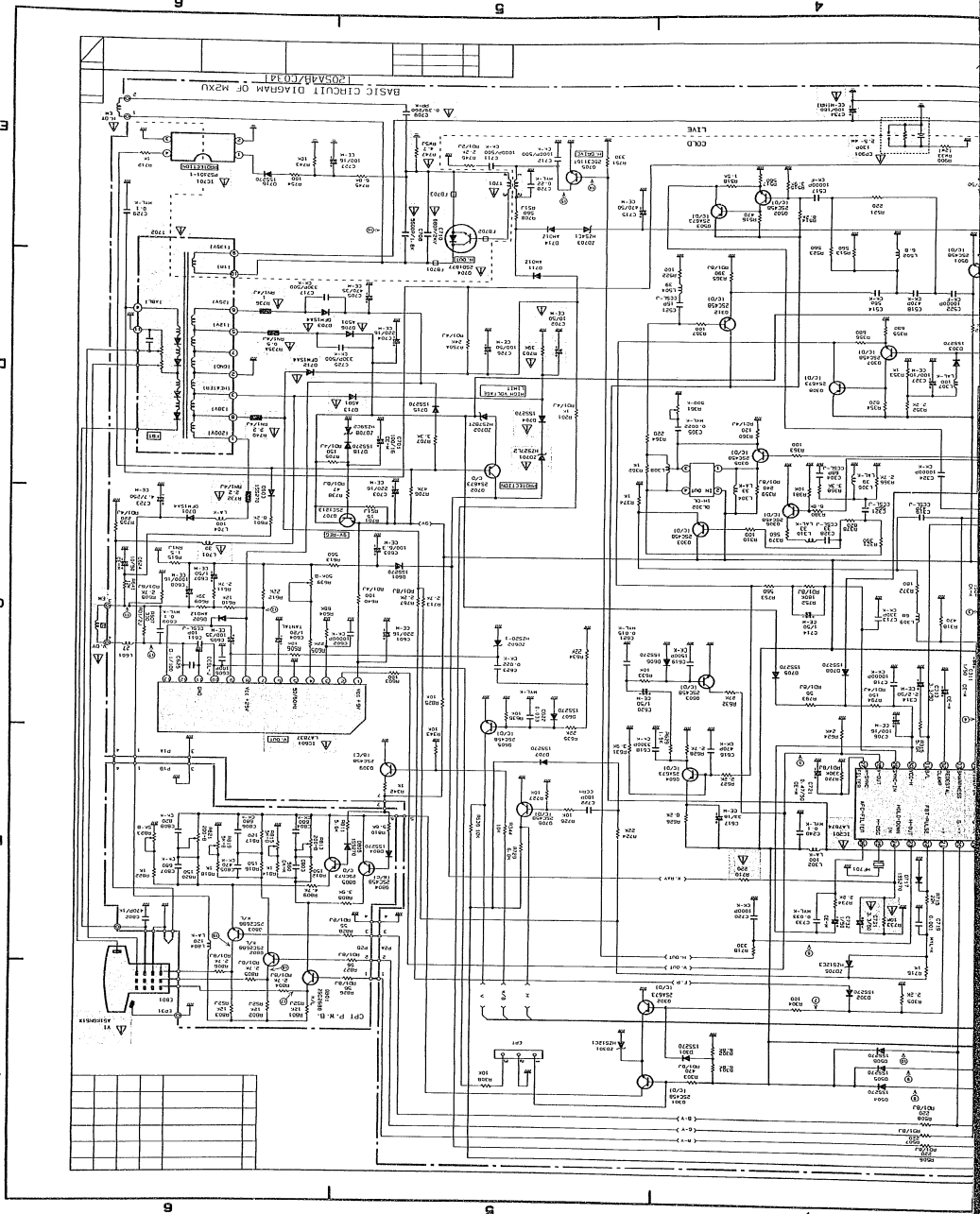
CIRCUIT NO.	FIN NO.	VOLTAGE (VDC)	CIRCUIT NO.	FIN NO.	VOLTAGE (VDC)
IC201	1	4.2	IC4001	1	9.3
	2	6.8		2	0.0
	3	6.8		3	0.0
	4	5.7		4	1.2
	5	4.3		5	1.3
	6	4.1		6	0.0
	7	0.0		7	4.7
	8	4.5		8	4.8
	9	4.5		9	0.0
	10	5.0		10	0.0
	11	8.9		11	8.3
	12	3.8		12	6.3
	13	3.5		13	0.0
	14	0.0		14	4.8
	15	0.0		15	4.8
	16	0.0		16	1.3
	17	0.0		17	1.3
	18	5.2		18	4.8
	19	5.3		19	0.0
	20	5.4		20	0.5
	21	4.1		21	7.8
	22	0.8		22	4.9
	23	0.3		23	4.9
	24	0.3		24	4.9
	25	5.3		25	0.0
	26	5.9		26	6.9
	27	8.0		27	0.0
	28	4.6		28	0.0
	29	7.0		29	8.0
	30	7.8		30	4.8
	31	4.2		31	4.8
	32	2.7		32	3.2
	33	4.6		33	3.0
	34	8.4		34	0.1
	35	8.4		35	0.1
	36	4.5		36	3.5
	37	0.0		37	3.5
	38	3.6		38	4.3
	39	7.0		39	0.7
	40	0.0		40	3.9
	41	4.2		41	4.1
	42	4.9		42	4.7
	43	0.3		43	4.2
	44	3.5		44	4.8
	45	3.2		45	4.8
	46	3.2		46	4.8
	47	5.9		47	5.9
	48	0.0		48	0.0
	49	2.0		49	2.0
	50	8.0		50	8.0
	51	8.0		51	8.0
	52	5.0		52	5.0
IC4002	1	4.6	IC4501	1	1.3
	2	0.0		2	0.0
	3	0.6		3	0.0
	4	4.7		4	0.0
	5	4.7		5	0.0
	6	4.7		6	1.3
	7	3.5		7	5.9
	8	2.6		8	10.3
	9	4.6		9	0.0
	10	0.0		10	11.4
	11	2.6		11	10.3
	12	2.6		12	10.3
	13	4.6		13	0.1
	14	4.6		14	0.1
	15	2.6		15	0.0
	16	1.4		16	0.0
	17	4.7		17	4.7
	18	4.7		18	4.7
	19	0.0		19	0.0
	20	4.6		20	4.6
	21	9.1		21	9.1
	22	4.6		22	4.6
	23	4.6		23	4.6
	24	4.6		24	4.6
	25	4.6		25	4.6
	26	4.6		26	4.6
	27	4.6		27	4.6
	28	4.6		28	4.6
	29	4.6		29	4.6
	30	4.6		30	4.6
	31	4.6		31	4.6
	32	4.6		32	4.6
	33	4.6		33	4.6
	34	4.6		34	4.6
	35	4.6		35	4.6
	36	4.6		36	4.6
	37	4.6		37	4.6
	38	4.6		38	4.6
	39	4.6		39	4.6
	40	4.6		40	4.6
	41	4.6		41	4.6
	42	4.6		42	4.6
	43	4.6		43	4.6
	44	4.6		44	4.6
	45	4.6		45	4.6
	46	4.6		46	4.6
	47	4.6		47	4.6
	48	4.6		48	4.6
	49	4.6		49	4.6
	50	4.6		50	4.6
	51	4.6		51	4.6
	52	4.6		52	4.6
IC601	1	0.8	IC701	1	0.8
	2	0.0		2	0.0
	3	0.0		3	0.0
	4	8.4		4	8.4
	5	0.0		5	0.0
	6	4.6		6	4.6
	7	4.2		7	4.2
	8	25.3		8	25.3
	9	2.5		9	2.5
	10	1.4		10	1.4
	11	1.4		11	1.4
	12	13.9		12	13.9
	13	25.9		13	25.9
	14	25.9		14	25.9
	15	25.9		15	25.9
	16	25.9		16	25.9
	17	25.9		17	25.9
IC801	1	0.0	IC901	1	0.0
	2	9.9		2	9.9
	3	17.2		3	17.2
	4	9.1		4	9.1
	5	9.1		5	9.1
	6	9.1		6	9.1
	7	9.1		7	9.1
	8	9.1		8	9.1
	9	9.1		9	9.1
	10	9.1		10	9.1
	11	9.1		11	9.1
	12	9.1		12	9.1
	13	9.1		13	9.1
	14	9.1		14	9.1
	15	9.1		15	9.1
	16	9.1		16	9.1
	17	9.1		17	9.1



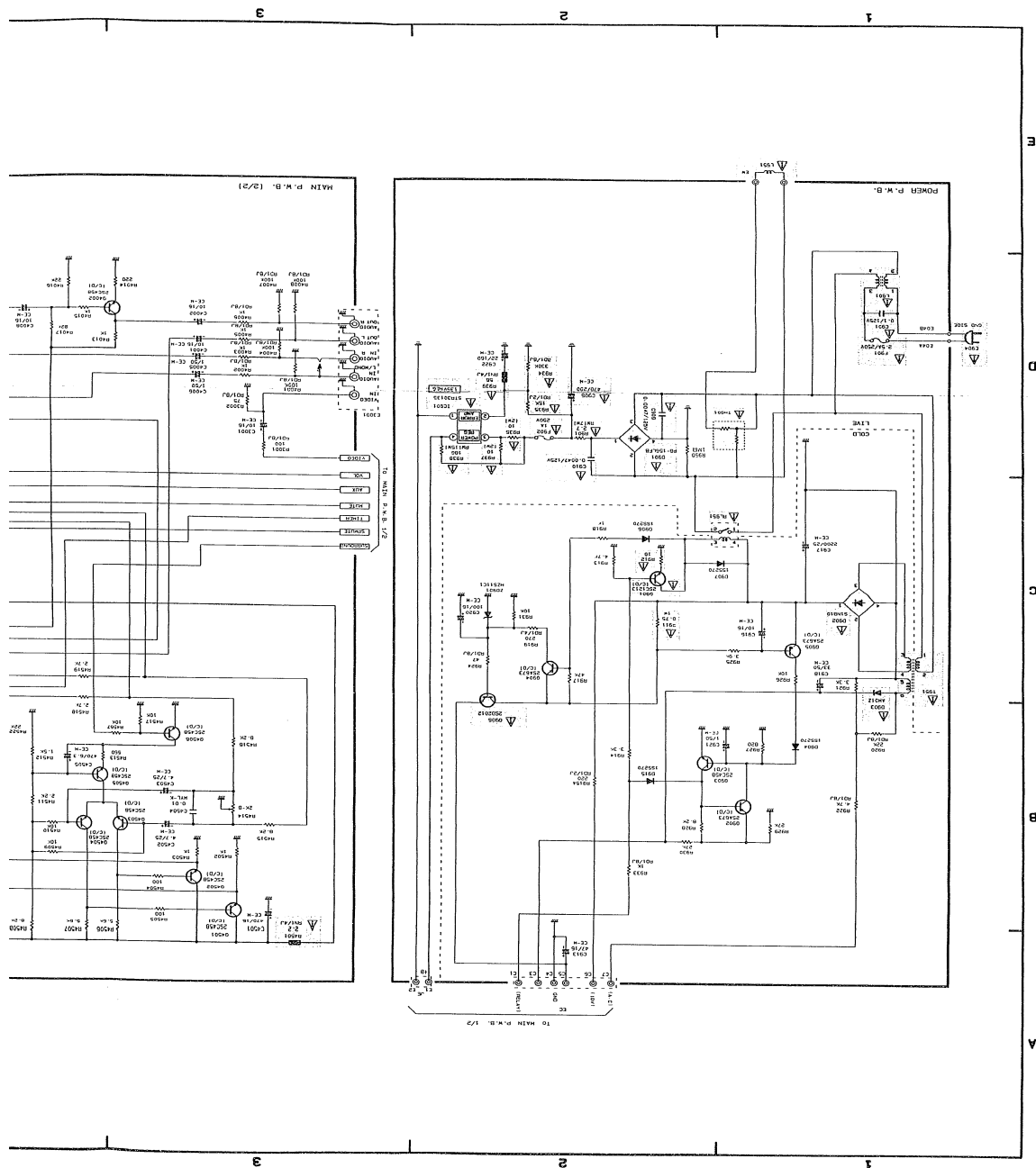
BASIC CIRCUIT DIAGRAM 20SA4B

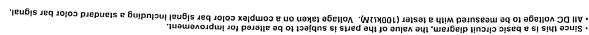
AM 20SA4B/C034 (01/02)

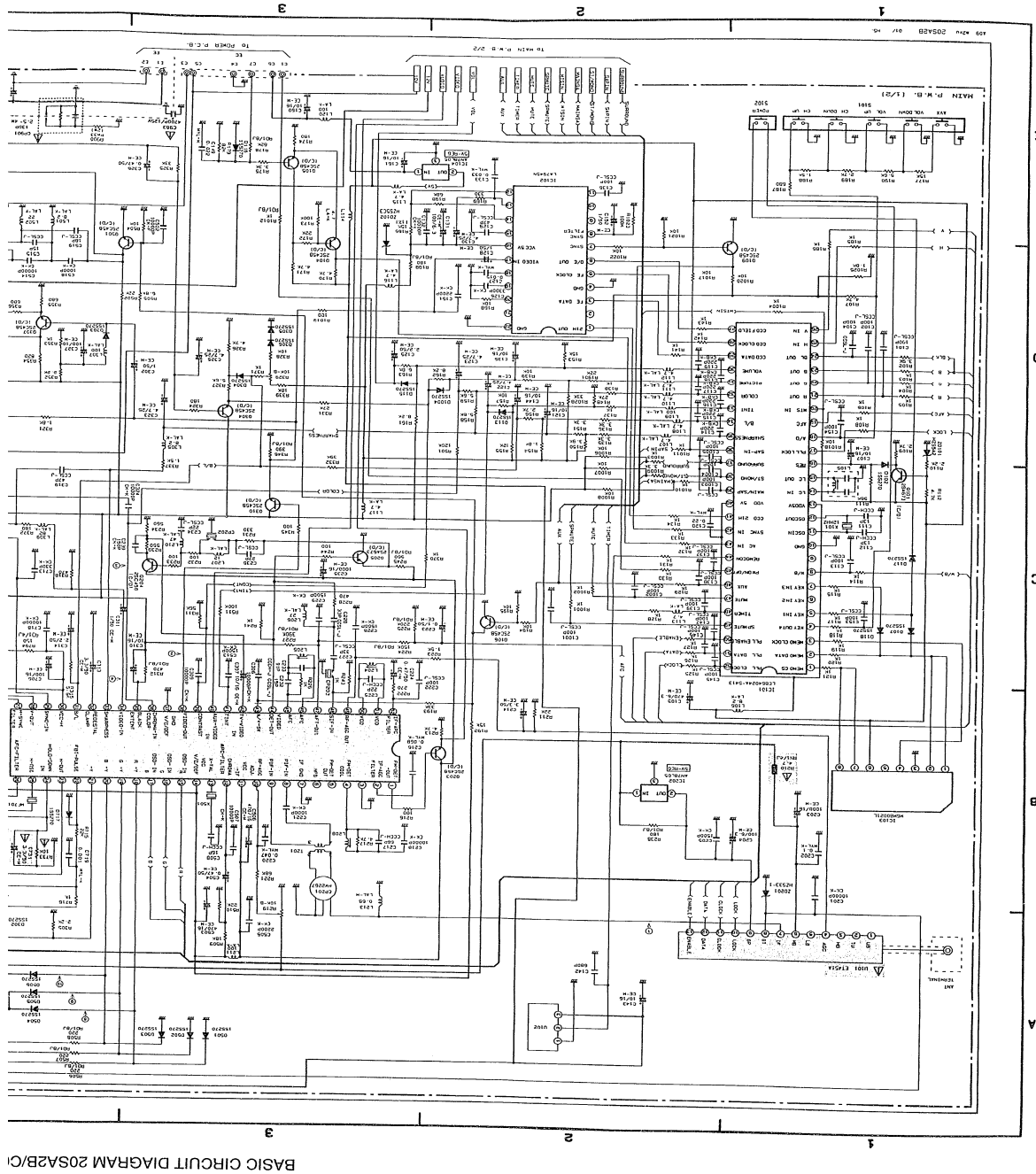
PRODUCT SAFETY NOTE: Components marked with a  and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.



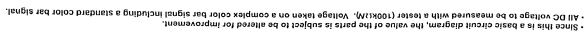
Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.
- All DC voltage to be measured with a tester (100k Ω /V). Voltage taken on a complex color bar signal.

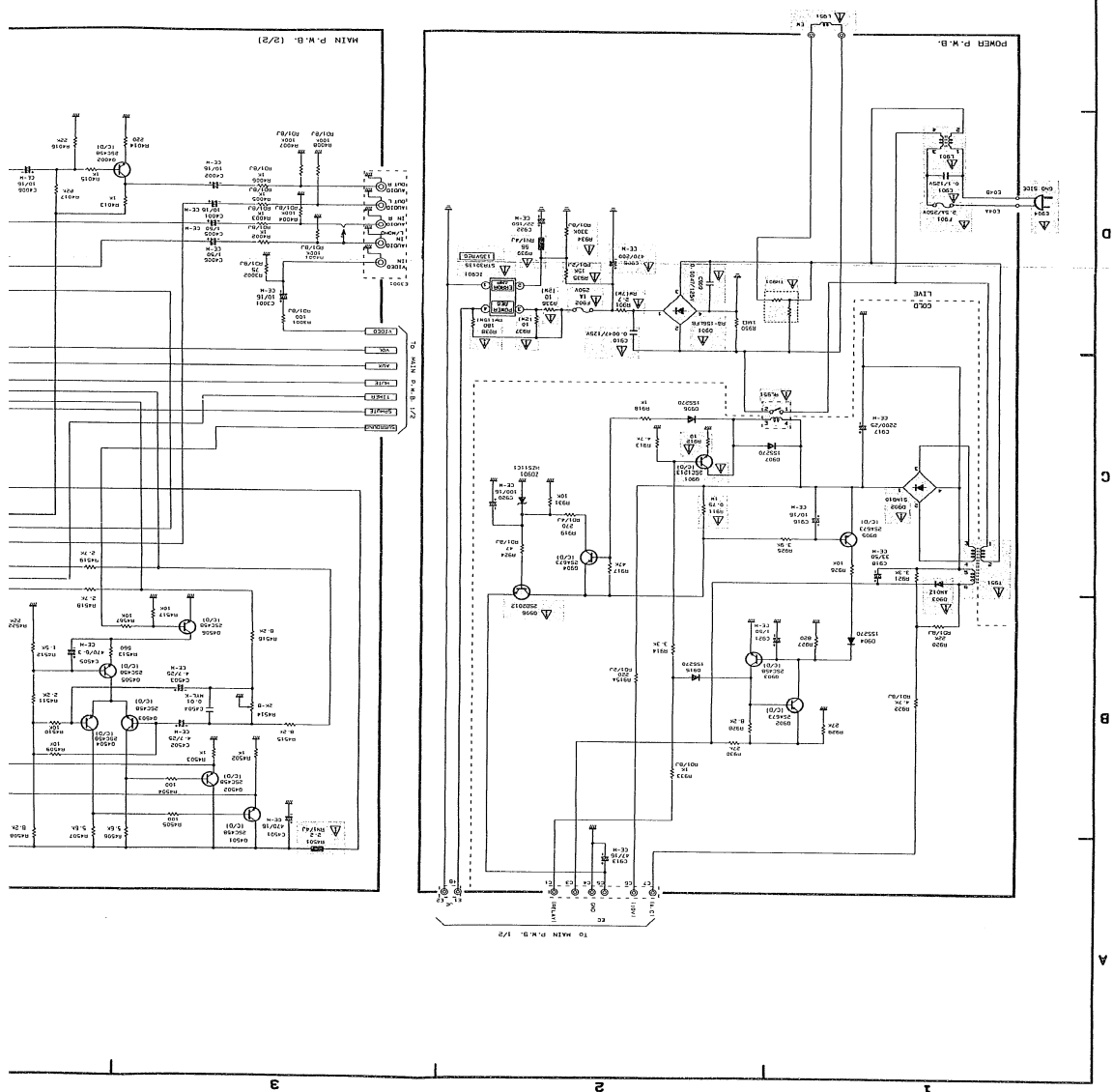




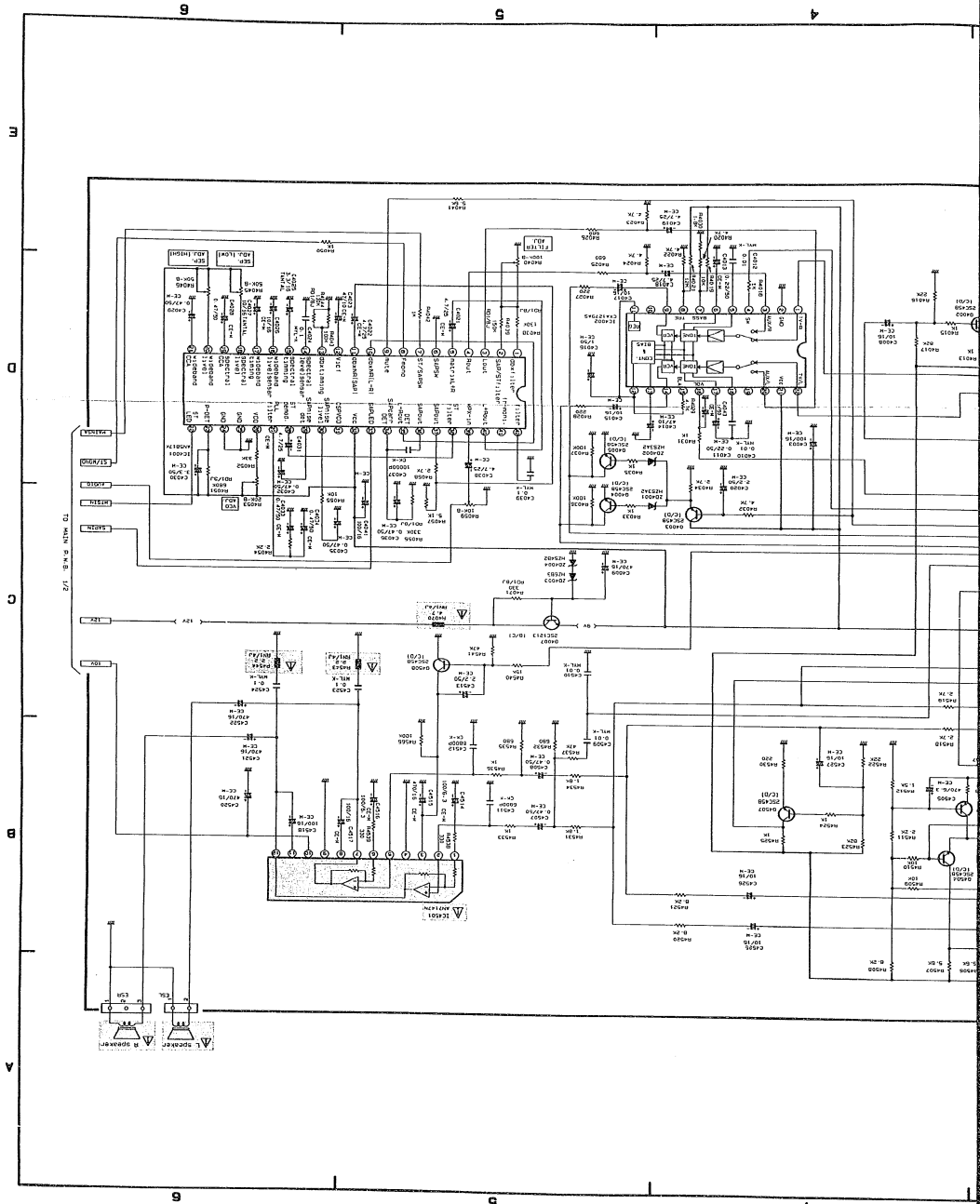


BASIC CIRCUIT DIAGRAM 20S42B/C





PRODUCT SAFETY NOTE: Components marked with a Δ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

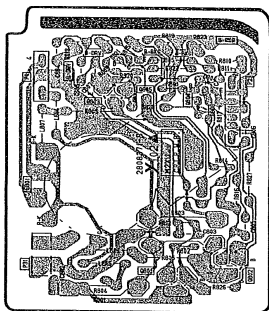


Since this is a basic circuit diagram, the value of the parts is subject to alteration for improvement. All DC voltage to be measured with a test set (100kV). Voltage taken on a complex color bar signal.

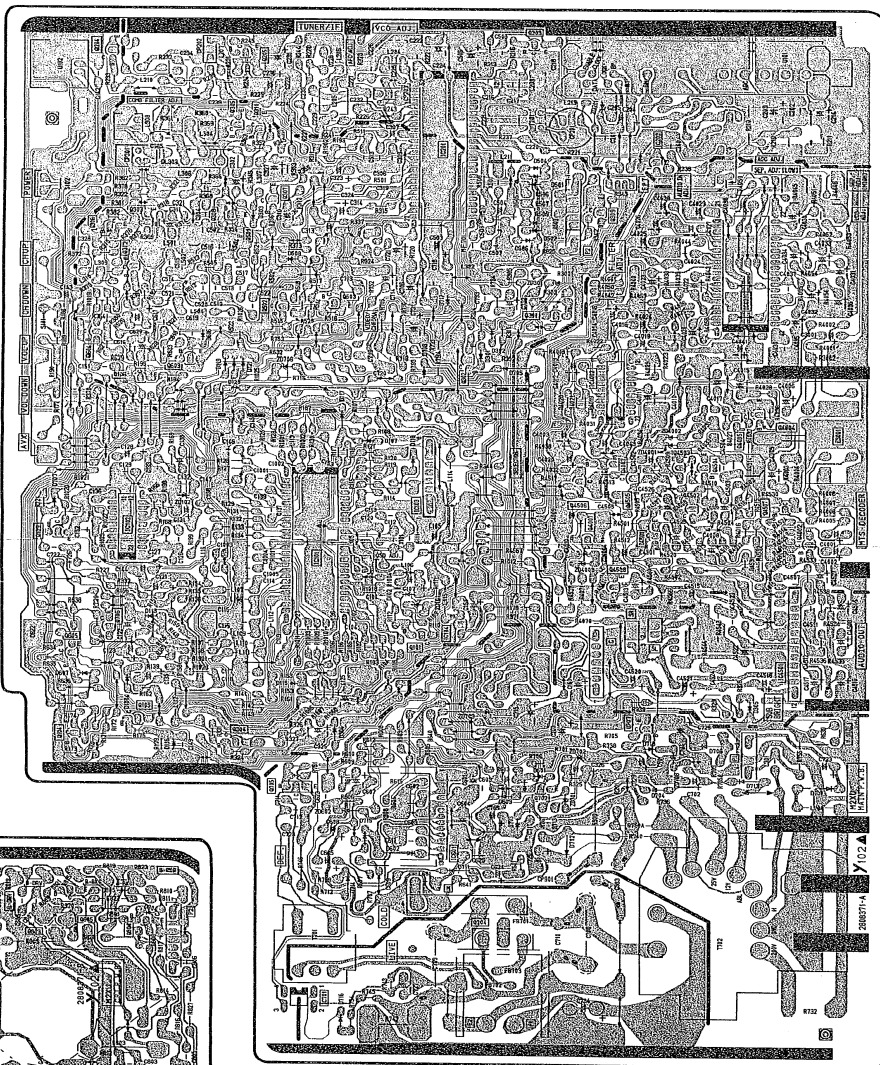
20SA2B/C032
20SA4B/C034

PRINTED WIRING BOARD

C.P.T. P.W.B.

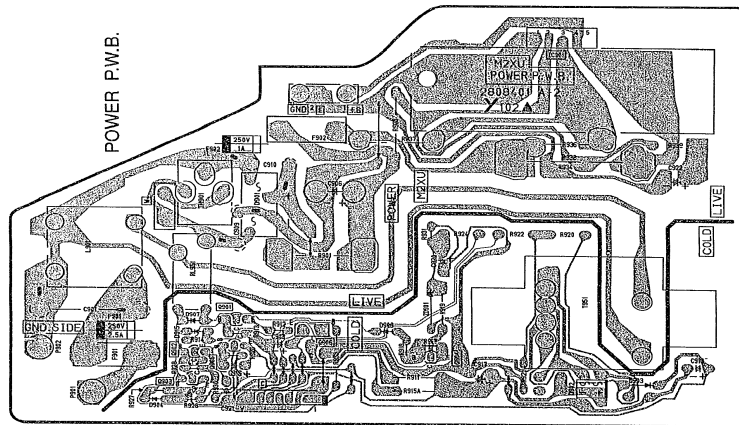


MAIN P.W.B.

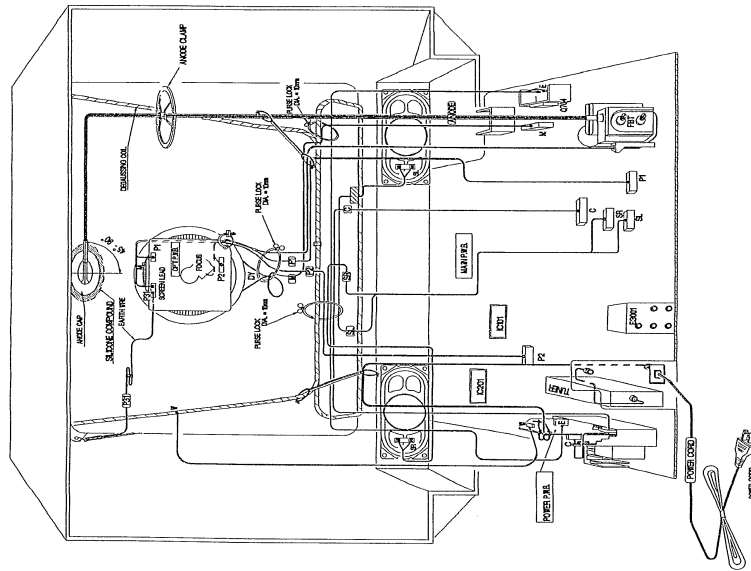


20SA2B/C032
20SA4B/C034

PRINTED WIRING BOARD



WIRING DIAGRAM



REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a  have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

ABBREVIATION			CAPACITORS - - - - - CD: Ceramic Disc; PF: Polyester Film; EL: Electrolytic; PP: Polypropylene; PT: Paper; TA: Tantalum; TN: Tinned; CF: Carbon Film; CR: Carbon Resistor; ME: Metal Oxide Film; Resistors - - - - - CRF: Carbon Resistor; VR: Variable Resistor; WVR: Wire Wound; FR: Fuse Resistor; MG: Metal Glazed Semiconductors - - - - - TR: Transistor; DI: Diode; ZD: Zener Diode; VA: Varistor; TH: Thermistor; IC: Integrated Circuit		
SYMBOL NO.	PART NO.	PART DESCRIPTION	SYMBOL NO.	PART NO.	PART DESCRIPTION
CAPACITORS					
C101	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C145	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V
C102	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C146	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V
C103	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C147	080046	POLYESTER FILM 0.022MF $\pm 10\%$ 50V
C104	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C148	080046	POLYESTER FILM 0.022MF $\pm 10\%$ 50V
C105	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C149	080046	POLYESTER FILM 0.022MF $\pm 10\%$ 50V
C106	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C150	080046	POLYESTER FILM 0.022MF $\pm 10\%$ 50V
C107	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C151	080046	POLYESTER FILM 0.022MF $\pm 10\%$ 50V
C108	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C152	080046	POLYESTER FILM 0.022MF $\pm 10\%$ 50V
C109	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C153	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V
C110	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C154	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V
C111	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C155	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V
C112	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C156	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C113	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C157	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C114	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C158	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C115	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C159	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C116	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C160	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C117	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C161	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C118	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C162	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C119	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C163	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C120	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C164	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C121	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C165	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C122	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C166	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C123	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C167	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C124	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C168	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C125	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C169	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C126	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C170	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C127	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C171	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C128	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C172	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C129	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C173	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C130	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C174	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C131	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C175	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C132	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C176	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C133	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C177	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C134	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C178	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C135	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C179	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C136	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C180	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C137	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C181	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C138	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C182	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C139	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C183	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C140	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C184	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C141	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C185	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C142	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C186	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C143	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C187	080015	CAPACITOR ELECTROLYTIC 10MF 16V
C144	080074	CAPACITOR CERAMIC DISCAL 100PF $\pm 5\%$ 50V	C188	080015	CAPACITOR ELECTROLYTIC 10MF 16V

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PRODUCT SAFETY NOTE: Components marked with a  have special characteristics important to safety. Before replacing any of these components, read carefully, the **PRODUCT SAFETY NOTICE** of this Service Manual. Don't degrade the safety of the receiver through

SYMBOL	SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	PART DESCRIPTION
R886	0700406	CF 2.7K OHM ±5% 16W (205446 ONLY)	R4051	0101033	CF 80K OHM ±5% .5% 16W	
R887	0700267	RESISTOR CARBON FLM 100 OHM ±5% .5% 16W	R4052	0700061	CF 100K OHM ±5% .5% 16W	
R888	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4053	0700061	CF 100K OHM ±5% .5% 16W	
R889	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4054	0700061	CF 100K OHM ±5% .5% 16W	
R890	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4055	0700061	CF 100K OHM ±5% .5% 16W	
R891	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4056	0700061	CF 100K OHM ±5% .5% 16W	
R892	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4057	0700061	CF 100K OHM ±5% .5% 16W	
R893	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4058	0700061	CF 100K OHM ±5% .5% 16W	
R894	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4059	0700061	CF 100K OHM ±5% .5% 16W	
R895	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4060	0700061	CF 100K OHM ±5% .5% 16W	
R896	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4061	0700061	CF 100K OHM ±5% .5% 16W	
R897	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4062	0700061	CF 100K OHM ±5% .5% 16W	
R898	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4063	0700061	CF 100K OHM ±5% .5% 16W	
R899	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4064	0700061	CF 100K OHM ±5% .5% 16W	
R900	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4065	0700061	CF 100K OHM ±5% .5% 16W	
R901	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4066	0700061	CF 100K OHM ±5% .5% 16W	
R902	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4067	0700061	CF 100K OHM ±5% .5% 16W	
R903	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4068	0700061	CF 100K OHM ±5% .5% 16W	
R904	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4069	0700061	CF 100K OHM ±5% .5% 16W	
R905	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4070	0700061	CF 100K OHM ±5% .5% 16W	
R906	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4071	0700061	CF 100K OHM ±5% .5% 16W	
R907	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4072	0700061	CF 100K OHM ±5% .5% 16W	
R908	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4073	0700061	CF 100K OHM ±5% .5% 16W	
R909	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4074	0700061	CF 100K OHM ±5% .5% 16W	
R910	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4075	0700061	CF 100K OHM ±5% .5% 16W	
R911	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4076	0700061	CF 100K OHM ±5% .5% 16W	
R912	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4077	0700061	CF 100K OHM ±5% .5% 16W	
R913	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4078	0700061	CF 100K OHM ±5% .5% 16W	
R914	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4079	0700061	CF 100K OHM ±5% .5% 16W	
R915	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4080	0700061	CF 100K OHM ±5% .5% 16W	
R916	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4081	0700061	CF 100K OHM ±5% .5% 16W	
R917	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4082	0700061	CF 100K OHM ±5% .5% 16W	
R918	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4083	0700061	CF 100K OHM ±5% .5% 16W	
R919	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4084	0700061	CF 100K OHM ±5% .5% 16W	
R920	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4085	0700061	CF 100K OHM ±5% .5% 16W	
R921	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4086	0700061	CF 100K OHM ±5% .5% 16W	
R922	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4087	0700061	CF 100K OHM ±5% .5% 16W	
R923	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4088	0700061	CF 100K OHM ±5% .5% 16W	
R924	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4089	0700061	CF 100K OHM ±5% .5% 16W	
R925	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4090	0700061	CF 100K OHM ±5% .5% 16W	
R926	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4091	0700061	CF 100K OHM ±5% .5% 16W	
R927	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4092	0700061	CF 100K OHM ±5% .5% 16W	
R928	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4093	0700061	CF 100K OHM ±5% .5% 16W	
R929	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4094	0700061	CF 100K OHM ±5% .5% 16W	
R930	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4095	0700061	CF 100K OHM ±5% .5% 16W	
R931	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4096	0700061	CF 100K OHM ±5% .5% 16W	
R932	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4097	0700061	CF 100K OHM ±5% .5% 16W	
R933	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4098	0700061	CF 100K OHM ±5% .5% 16W	
R934	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4099	0700061	CF 100K OHM ±5% .5% 16W	
R935	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4100	0700061	CF 100K OHM ±5% .5% 16W	
R936	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4101	0700061	CF 100K OHM ±5% .5% 16W	
R937	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4102	0700061	CF 100K OHM ±5% .5% 16W	
R938	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4103	0700061	CF 100K OHM ±5% .5% 16W	
R939	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4104	0700061	CF 100K OHM ±5% .5% 16W	
R940	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4105	0700061	CF 100K OHM ±5% .5% 16W	
R941	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4106	0700061	CF 100K OHM ±5% .5% 16W	
R942	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4107	0700061	CF 100K OHM ±5% .5% 16W	
R943	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4108	0700061	CF 100K OHM ±5% .5% 16W	
R944	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4109	0700061	CF 100K OHM ±5% .5% 16W	
R945	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4110	0700061	CF 100K OHM ±5% .5% 16W	
R946	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4111	0700061	CF 100K OHM ±5% .5% 16W	
R947	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4112	0700061	CF 100K OHM ±5% .5% 16W	
R948	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4113	0700061	CF 100K OHM ±5% .5% 16W	
R949	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4114	0700061	CF 100K OHM ±5% .5% 16W	
R950	0700048	CF 1K OHM ±5% 16W (205446 ONLY)	R4115	0700061	CF 100K OHM ±5% .5% 16W	

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PRODUCT SAFETY NOTE: Components marked with a Δ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION	SYMBOL NO.	PART NO.	PART DESCRIPTION
D16	2338301	D1 1S5270	20702	2338555	ZD 425782
D17	2338321	D1 1S5270	20703	2338557	DIODE ZENER 425C1
D18	2338321	D1 1S5270	20704	2338558	ZD 425782
D19	2338321	D1 1S5270	20705	2338559	ZD 425782
D20	2338321	D1 1S5270	20706	2338560	ZD 425782
D21	2338321	D1 1S5270	20707	2338561	ZD 425782
D22	2338321	D1 1S5270	20708	2338562	ZD 425782
D23	2338321	D1 1S5270	20709	2338563	ZD 425782
D24	2338321	D1 1S5270	20710	2338564	ZD 425782
D25	2338321	D1 1S5270	20711	2338565	ZD 425782
D26	2338321	D1 1S5270	20712	2338566	ZD 425782
D27	2338321	D1 1S5270	20713	2338567	ZD 425782
D28	2338321	D1 1S5270	20714	2338568	ZD 425782
D29	2338321	D1 1S5270	20715	2338569	ZD 425782
D30	2338321	D1 1S5270	20716	2338570	ZD 425782
D31	2338321	D1 1S5270	20717	2338571	ZD 425782
D32	2338321	D1 1S5270	20718	2338572	ZD 425782
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HITACHI